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# Salience Theory of Judicial Decisions

Pedro Bordalo, Nicola Gennaioli, and Andrei Shleifer

## ABSTRACT

We present a model of judicial decision making in which the judge overweights the salient facts of the case. The context of the judicial decision, which is comparative by nature, shapes which aspects of the case stand out and draw the judge's attention. By focusing judicial attention on such salient aspects of the case, legally irrelevant information can affect judicial decisions. Our model accounts for a range of recent experimental evidence that bears on the psychology of judicial decisions, including anchoring effects in the setting of damages, decoy effects in choice of legal remedies, and framing effects in the decision to litigate. The model also offers a new approach to positive analysis of damage awards in torts.

## 1. INTRODUCTION

According to legal formalism, judges deciding cases impartially verify facts and apply well-defined law to these facts, with no room left for policy considerations, extralegal norms, or biases. After all, the theory goes, judges are selected and trained to perform such formal analysis; they need to explain their opinions in writing, which disciplines thought; they are constrained by the adversarial system from missing relevant facts or rules; and they are kept on their toes by the risk of appellate review. In stark contrast to this perspective, legal realism holds that both trial and appellate judges enjoy significant discretion in deciding cases. Exercise of such discretion turns not just on the merits of the case but also on personal factors such as judges' political views, beliefs about the litigants, or the lawyers' persuasive tactics.

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One important strand of legal realism is rule skepticism, which emphasizes the discretion exercised by appellate courts in applying law to an established set of facts (Posner 2008; Epstein, Landes, and Posner 2013). Another strand, called fact skepticism, focuses on the discretion that trial courts exercise in establishing facts (Radin 1925; Frank 1930, 1949; Gennaioli and Shleifer 2008). Jerome Frank in particular stressed the importance of psychology for fact-finding, claiming that judges and juries are often mistaken, biased, or inattentive (Frank 1949). The role of psychology in judicial decisions is again receiving some attention, especially in experimental research (Guthrie, Rachlinski, and Wistrich 2001; Kelman, Rottenstreich, and Tversky 1996; Viscusi 1999; Rachlinski, Wistrich, and Guthrie 2013). This research is based on the classic work of Kahneman and Tversky (1979; Tversky and Kahneman 1974), who identify a range of heuristics that decision makers use to make judgments and document biases that result from the use of such intuitive heuristics. We recently proposed salience theory to unify the existing evidence on heuristic decision making (Bordalo, Gennaioli, and Shleifer 2012, 2013). In this paper, we revisit experimental evidence on judicial biases from the perspective of this theory.

Salience theory builds on the premise that the valuation of a choice option occurs not in isolation but in a comparative context. Decision makers contrast the features of the option in question with the features of choice alternatives or of “normal” situations that come to the decision maker’s mind. For instance, the valuation of a premium good may fall if the good’s high price (rather than its high quality) is salient, as when the good is presented together with cheaper alternatives or when the decision maker is accustomed to buying the same good at lower prices. The cognitive underpinning of salience theory is that human decisions are mediated by perception and attention. In evaluating a range of options, attention is drawn to unusual, extreme, or salient attributes of each option. Because they draw attention, salient attributes receive more weight in the decisions than is justified by normative theory. Salience theory accounts for well-documented behavioral patterns such as the instability of risk preferences (including preference reversals and Allais paradoxes) and more generally provides a novel and psychologically based account of context effects (such as decoy effects). By shaping what is perceived as normal and what is perceived as unusual or salient, context influences attention and decisions.

This logic seems useful to examine judicial behavior. After all, most judicial decision making is comparative. Judges compare the facts of the

present case with facts of similar cases, legal precedents, statutes, personal experiences or expectations in similar situations, and so on. The fact that judicial decisions are made in context is partly by design; precedents are indeed supposed to anchor judicial decisions. At the same time, salience theory suggests that these anchors may focus judicial attention on peculiar aspects of the case that, although salient, may not be the most useful or relevant for the legal decision.

In this paper, we first summarize salience theory and then apply it to several experiments that bear on the psychology of judicial decisions. In particular, we consider anchoring mechanisms in the setting of damages, decoy effects affecting the choice among different legal remedies, and framing of payoffs in shaping the choice of settlement versus litigation. The key papers on which our analysis draws include Rachlinski (1996), Guthrie, Rachlinski, and Wistrich (2001), Kelman, Rottenstreich, and Tversky (1996), and Viscusi (1999, 2001). We show that salience theory provides a unified account of arguably disparate bits of evidence on judicial decision making but also offers a new approach to positive analysis of damage awards in torts. In Section 4, we consider some implications of salience theory for such topics as legal evolution, legal procedure, and the stability of law.

## 2. SALIENCE THEORY

### 2.1. A Simple Example

We first illustrate the logic of salience in the context of attitudes toward risk. Consider the following experiments involving a choice between two risky prospects, or lotteries:

*Experiment 1.* Choose between the following two options:

$$L_1 = \begin{cases} \$1 & \text{with probability .95,} \\ \$381 & \text{with probability .05,} \end{cases} \quad L_2 = \{\$20 \text{ for sure.} \quad (1)$$

*Experiment 2.* Choose between the following two options:

$$L_1 = \begin{cases} \$301 & \text{with probability .95,} \\ \$681 & \text{with probability .05,} \end{cases} \quad L_2 = \{\$320 \text{ for sure.} \quad (2)$$

In both experiments, the risky option  $L_1$  offers a small (5 percent) probability of a high payoff and a high (95 percent) probability of a \$19 loss relative to the sure outcome given by  $L_2$ , but the two lotteries have

the same expected payoff. Experiment 2 simply adds \$300 to all the payoffs in experiment 1.

A sample of 120 subjects participated in the two experiments (see Bordalo, Gennaioli, and Shleifer 2012). In experiment 1, 83 percent of the subjects chose the safe option  $L_2$ , while in experiment 2, 67 percent of the same subjects chose the risky lottery  $L_1$ . Given that in each experiment the two options offer the same expected value, the same subjects exhibit risk aversion in the first experiment and are risk seeking in the second.

According to expected-utility theory, the stakes in either experiment are so low compared with lifetime wealth that people ought to be roughly risk neutral, choosing the risky lottery approximately 50 percent of the time. A small level of risk aversion would create stable preferences for the safe lottery  $L_2$  in both experiments. Salience theory, in contrast, predicts the observed pattern of risk aversion in experiment 1 and risk-seeking behavior in experiment 2.<sup>1</sup> In experiment 1, the risky lottery  $L_1$ 's downside of \$1 feels very low relative to the sure payoff of \$20. This bad outcome is salient, and subjects overweight it in their decision, which leads to risk-averse behavior. In experiment 2, the risky lottery  $L_1$ 's downside of \$301 looks fairly similar to the sure payoff of \$320. The prospect of winning \$681 is more salient, which leads to risk-seeking behavior.

As we show in Bordalo, Gennaioli, and Shleifer (2013), the same logic of comparative evaluation can be applied to riskless choice. To give an example, imagine yourself in a wine store, choosing a red wine. You consider a French syrah from the Rhone Valley, selling for \$20 a bottle, and an Australian shiraz selling for \$10. You like French syrah better; you think it is perhaps 50 percent better. Yet it sells for twice as much. You decide that the Australian shiraz is a better bargain and buy a bottle.

A few weeks later, you are at a restaurant, and you see the same two wines on the wine list. Both of them are now marked up by \$40, with the French syrah selling for \$60 a bottle and the Australian shiraz for \$50. You again think that the French wine is 50 percent better, but now it is only 20 percent more expensive. At the restaurant, it is a better deal. You splurge and order the French wine. Salience theory again pre-

1. Prospect theory (Kahneman and Tversky 1979) holds that people overweight the small 5 percent probability of the high outcome, favoring risk-loving behavior in both experiments. To obtain the reversal of risk attitudes in experiments 1 and 2, prospect theory requires a combination of probability weighting and decreasing absolute risk aversion in the value function, provided that the decision maker's reference point is the status quo, no gains or losses. If instead the reference point is the sure gain, the two choice problems are identical, and prospect theory cannot account for the evidence. A systematic comparison of prospect and salience theory is presented in Bordalo, Gennaioli, and Shleifer (2012).

dicts this reversal. At the store, the price difference between the cheaper and the more expensive wine is more salient than the quality difference, encouraging the consumer to opt for the cheaper option, whereas at the restaurant, after the markups, the quality difference is more salient, encouraging the consumer to splurge.

These examples illustrate how decision makers think in context when figuring out which of several choices represents a better deal in light of the options available. We next describe the salience model, formalizing the intuition behind such thinking.

## 2.2. The Model

A decision maker evaluates  $N > 1$  alternatives in a choice context  $\mathbf{Ch} = \{(a_{1k}, a_{2k})\}_{k=1, \dots, N}$ , whose generic element is an option  $k$  identified by the vector of its two attributes  $a_{1k}$  and  $a_{2k}$ . Attributes are measured in dollars and are known to the decision maker. The choice context  $\mathbf{Ch}$  contains the alternatives of choice but can in addition contain normal choice options that are usually considered by the decision maker but are not currently available or other options that are explicitly brought to the decision maker's attention.

This framework is sufficiently general to accommodate several applications. In choice under risk, the choice context  $\mathbf{Ch}$  consists of different risky prospects with up to two different payoffs, in which case the attributes describe prospects' payoffs (Bordalo, Gennaioli, and Shleifer 2012; see also the framing example in Section 3). In riskless choice, the choice context consists of different consumer goods, in which case the attributes stand for quality and price (Bordalo, Gennaioli, and Shleifer 2013). In a litigation example, the choice context consists of the loss and damages from different decisions available to the judge (see Section 1).

A fully rational decision maker values option  $k$  according to the linear utility function

$$u(a_{1k}, a_{2k}) = \theta_1 a_{1k} + \theta_2 a_{2k}, \quad (3)$$

where  $\theta_1, \theta_2 > 0$ , and weights add up to 1:  $\theta_1 + \theta_2 = 1$ . If the decision maker chooses among risky prospects,  $\theta_1$  captures the probability of state 1 and  $\theta_2 = 1 - \theta_1$  the probability of state 2. If the decision maker chooses among consumer goods characterized by quality and price, then  $\theta_1$  is the weight on quality  $q_k$ , while  $\theta_2$  is the weight on price  $p_k$  (so that  $a_{1k} = q_k$  and  $a_{2k} = -p_k$ ). We assume for simplicity that in this case  $\theta_1 = \theta_2 = \frac{1}{2}$ .

A salient thinker departs from equation (3) by inflating the relative weight attached to the attribute that he perceives to be more salient. An

attribute is salient for option  $k$  in the choice set  $\mathbf{Ch}$  if this attribute stands out relative to the other attributes of the same option. Formally, denote by  $(\bar{a}_1, \bar{a}_2)$  the reference option consisting of average attributes  $\bar{a}_i = \sum_k a_{ik}/N$  in  $\mathbf{Ch}$ . The salience of attribute  $i = 1, 2$ , for a generic option  $k$  is then given by  $\sigma(a_{ik}, \bar{a}_i)$ , where  $\sigma(\cdot, \cdot)$  is a salience function that satisfies the following properties:

**Definition 1.** The salience function  $\sigma(\cdot, \cdot)$  is symmetric and continuous and satisfies the following:

1. *Ordering.* Let  $\mu = \text{sgn}(a_{ik} - \bar{a}_i)$ .<sup>2</sup> Then for any  $\varepsilon, \varepsilon' \geq 0$  with  $\varepsilon + \varepsilon' > 0$ , we have

$$\sigma(a_{ik} + \mu\varepsilon, \bar{a}_i - \mu\varepsilon') > \sigma(a_{ik}, \bar{a}_i). \quad (4)$$

2. *Diminishing Sensitivity.* For any  $a_{ik}, \bar{a}_i \geq 0$  and all  $\varepsilon > 0$ , we have

$$\sigma(a_{ik} + \varepsilon, \bar{a}_i + \varepsilon) < \sigma(a_{ik}, \bar{a}_i). \quad (5)$$

3. *Reflection.* For any  $a_{ik}, \bar{a}_i, a'_{ik}, \bar{a}'_i \geq 0$ , we have

$$\sigma(a_{ik}, \bar{a}_i) > \sigma(a'_{ik}, \bar{a}'_i) \Leftrightarrow \sigma(-a_{ik}, -\bar{a}_i) > \sigma(-a'_{ik}, -\bar{a}'_i). \quad (6)$$

For a given option  $k$ , its attribute 1 is salient when  $\sigma(a_{1k}, \bar{a}_1) > \sigma(a_{2k}, \bar{a}_2)$ , while its attribute 2 is salient when  $\sigma(a_{1k}, \bar{a}_1) < \sigma(a_{2k}, \bar{a}_2)$ . Attributes 1 and 2 are equally salient when  $\sigma(a_{1k}, \bar{a}_1) = \sigma(a_{2k}, \bar{a}_2)$ .

Definition 1 encodes three key features of sensory perception. First, our perceptive apparatus is attuned to detect changes in stimuli. This is captured by ordering, which states that salience increases in contrast: option  $k$ 's value of attribute  $i$ , namely,  $a_{ik}$ , is more salient the further it is from the reference value  $\bar{a}_i$  of that attribute. In the consumer-choice example, if a consumer good is much cheaper than average, then its low price is very salient. In the risky-choice example, if in a given state of the world a risky lottery pays much more than all the other lotteries do, then that high payoff is salient for the lottery in question.

The second feature is that changes in stimuli are perceived with diminishing sensitivity.<sup>3</sup> Formally, an attribute's salience decreases as the value of that attribute increases uniformly for all options. For instance, at higher price (or payoff) levels, given price (or payoff) differences are

2. When  $a_{ik} = \bar{a}_i$ , the ordering condition of equation (4) holds for  $\mu \pm 1$ .

3. In the context of sensorial perception, this property is known as Weber's law, after the 19th-century German physician Ernst Weber, who studied experimental psychology. For example, a given change in luminosity is perceived less intensely if it occurs at a higher luminosity level.

less noticeable and thus less salient. The difference between \$10 and \$20 looms larger than the difference between \$110 and \$120.

Third, our perceptive apparatus is sensitive to differences in magnitudes, or absolute values, so the impact of salience on positive and negative attributes is formally identical. In the case of consumer goods, quality and price are treated symmetrically. In the case of lotteries, we attend to unusually large positive and negative payoffs equally.

These features interact to determine the salience of each option's attributes, but they can also be in tension. For instance, in the consumer goods case, if price levels and price dispersion both increase, then diminishing sensitivity suggests that price salience decreases, while ordering suggests the opposite. Following Bordalo, Gennaioli, and Shleifer (2013), we resolve this tension by assuming that the salience function is homogeneous of degree 0:

**Assumption 0.** The salience function satisfies ordering and homogeneity of degree 0, which is defined as  $\sigma(\alpha \times a_i, \alpha \times \bar{a}_i) = \sigma(a_i, \bar{a}_i)$  for all  $\alpha \neq 0$  and all  $a_i, \bar{a}_i \neq 0$ .

Homogeneity of degree 0 characterizes salience in an intuitive way: an attribute's salience increases with the proportional difference in the value of that attribute relative to the reference level.<sup>4</sup> Together with ordering, homogeneity implies diminishing sensitivity and reflection of salience.

An example of a salience function satisfying homogeneity of degree 0 is

$$\sigma(a_{ik}, \bar{a}_i) = \frac{|a_{ik} - \bar{a}_i|}{|a_{ik}| + |\bar{a}_i|}, \quad (7)$$

for  $a_{ik}, \bar{a}_i \neq 0$ , and  $\sigma(0, 0) = 0$ .

Consider how salience distorts the valuation of an option in the choice set. Given a salience function  $\sigma$ , the decision maker—we call him a salient thinker—ranks the salience of the option's attributes and distorts their utility weights as follows:

**Definition 2.** The salient thinker's valuation of option  $k$  enhances the relative weight attached to the salient attribute (while keeping the sum of utility weights constant). Formally,

4. In other words, on a variation in an option's attribute  $a_{ik}$ , ordering dominates diminishing sensitivity if and only if the change in  $a_{ik}$  is proportionally larger than the induced change in the reference  $\bar{a}_k$ .



$$u_k^s = \begin{cases} \frac{\theta_1}{\theta_1 + \delta\theta_2} \times a_{1k} + \frac{\delta\theta_2}{\theta_1 + \delta\theta_2} \times a_{2k} & \text{if } \sigma(a_{1k}, \bar{a}_1) > \sigma(a_{2k}, \bar{a}_2), \\ \frac{\delta\theta_1}{\delta\theta_1 + \theta_2} \times a_{1k} + \frac{\theta_2}{\delta\theta_1 + \theta_2} \times a_{2k} & \text{if } \sigma(a_{1k}, \bar{a}_1) < \sigma(a_{2k}, \bar{a}_2), \\ \theta_1 \times a_{1k} + \theta_2 \times a_{2k} & \text{if } \sigma(a_{1k}, \bar{a}_1) = \sigma(a_{2k}, \bar{a}_2). \end{cases} \quad (8)$$

where  $\delta \in (0, 1]$  decreases in the severity of salient thinking.

When evaluating an option  $k$ , the salient thinker pays more attention to, and overweights, its salient attribute. If attribute 1 is salient, its relative utility weight increases from  $\theta_1$  to  $\theta_1/(\theta_1 + \delta\theta_2) > \theta_1$ , while the relative weight of attribute 2 decreases from  $\theta_2$  to  $\delta\theta_2/(\theta_1 + \delta\theta_2) < \theta_2$ . Conversely, if attribute 2 is salient, its relative utility weight increases to  $\theta_2/(\theta_2 + \delta\theta_1) > \theta_2$ , while the relative weight of attribute 1 decreases to  $\delta\theta_1/(\theta_2 + \delta\theta_1) < \theta_1$ . As  $\delta \rightarrow 0$ , the salient thinker considers only the most salient attribute and fully neglects the nonsalient attribute. If  $\delta = 1$ , the salient thinker pays equal attention to both salient and nonsalient attributes, so his valuation is rational. Normalization of the utility weights ensures that valuation of the option  $(a_{1k}, a_{2k})$  lies between  $a_{1k}$  and  $a_{2k}$ .

The salience model provides a novel and unified framework to explain a large set of anomalies in individual choice, both in a riskless setting (Bordalo, Gennaioli, and Shleifer 2013) and in choice under risk (Bordalo, Gennaioli, and Shleifer 2012). We now consider two examples of the impact of salience on choice, which will bear on our subsequent analysis of judicial decision making.

### 2.3. Payoff Salience and the Instability of Risk Attitudes

To illustrate the model, we now work through experiments 1 and 2 in Section 1. Each experiment compares a risky lottery to a sure prospect. The risky lottery's downside occurs in state 1, with probability  $\theta_1 = .95$ , and its upside in state 2, with probability  $\theta_2 = .05$ . In experiment 1, the two options are  $L_1 = (a_{11}, a_{21}) = (1, 381)$  and  $L_2 = (a_{12}, a_{22}) = (20, 20)$ . The reference payoffs are then given by  $(\bar{a}_1, \bar{a}_2) = [(20 + 1)/2, (20 + 381)/2] = 10.5, 200.5$ . The salience of  $L_1$ 's downside is  $\sigma(a_{11}, \bar{a}_1) = \sigma(10.5, 1)$ , while the salience of its upside is  $\sigma(a_{21}, \bar{a}_2) = \sigma(381, 200.5)$ . The most salient payoff of  $L_1$  is its downside, because it exhibits a larger percentage difference from the relevant reference payoff, namely,  $10.5/1 > 381/200.5$ .<sup>5</sup>

5. In greater detail,  $\sigma(a_{11}, \bar{a}_1) = \sigma(1, 10.5)$ , which equals  $\sigma(10.5, 1)$  by symmetry of the salience function. In turn,  $\sigma(381, 200.5) = \sigma(381/200.5, 1)$  because of homogeneity. Then ordering ensures that  $\sigma(10.5, 1) > \sigma(381/200.5, 1)$ , because  $10.5 > 381/200.5$ .

Given this salience ranking, equation (8) implies that the lotteries are evaluated as

$$u^s(L_1) = \frac{.95}{.95 + \delta \times .05} \times 1 + \frac{\delta \times .05}{.95 + \delta \times .05} \times 381, \quad u^s(L_2) = 20. \quad (9)$$

In evaluating lottery  $L_1$ , the salient thinker increases the weight attached to its salient downside of \$1 and reduces the weight attached to its upside of \$381. As a consequence, his evaluation of  $L_1$  falls below its expected value of 20. The valuation of the sure prospect  $L_2$  is instead unaffected by salience, because it yields the same payoff in all states. As a consequence, in experiment 1 the salient thinker is risk averse, choosing  $L_2$  over  $L_1$ .

Consider the behavior of the salient thinker in experiment 2. The two options are  $L_1 = (a_{11}, a_{21}) = (301, 681)$  and  $L_2 = (a_{12}, a_{22}) = (320, 320)$ , and the reference payoffs are  $(\bar{a}_1, \bar{a}_2) = (310.5, 500.5)$ . The salient payoff for  $L_1$  is its upside, because state 2 features a higher percentage payoff difference than state 1, namely,  $681/500.5 > 310.5/301$ . The two options are now valued as

$$u^s(L_1) = \frac{\delta \times .95}{\delta \times .95 + .05} \times 301 + \frac{.05}{\delta \times .95 + .05} \times 681, \quad u^s(L_2) = 320.$$

In evaluating lottery  $L_1$ , the salient thinker now increases the weight attached to its salient upside \$681 and reduces that of its downside \$301, so that  $u^s(L_1) > 320$ . Like the experimental subjects, the salient thinker is now risk seeking and prefers  $L_1$  to  $L_2$ .

From this analysis we distill the following psychological intuition for the reversal in risk attitudes. The choice between the two lotteries requires individuals to trade off—for given probabilities—the \$19 loss against the \$361 gain of the risky lottery. In standard theory, individuals evaluate this trade-off in absolute terms, making context-independent choices. Salience theory, in contrast, captures the psychological principle that individuals evaluate costs and benefits not in a vacuum but relative to the choice context they face. The \$19 loss of the risky lottery looks much smaller (and thus nonsalient) when the payoff level is high, at \$320, than when the payoff level is low, at \$20. In contrast, the \$361 gain of the risky lottery looks quite large regardless of the payoff level. The shift in payoff levels changes the anchor to which lottery gains and losses are compared, which explains the shift from risk aversion in experiment 1 to risk seeking in experiment 2.

## 2.4. Wine and Decoys

Consider again the riskless choice between a French syrah and an Australian shiraz. At the store, the French syrah has attributes  $(30, -20)$  and the Australian shiraz has attributes  $(20, -10)$ , where attribute 1 captures quality while attribute 2 captures price (both measured in dollars). In the store the reference wine is  $(\bar{a}_1, \bar{a}_2) = (25, -15)$ . In this case, price is salient for both the French syrah (that is,  $30/25 < 20/15$ ) and the Australian shiraz (that is,  $25/20 < 15/10$ ). The salient thinker focuses on price and chooses the cheaper Australian wine. Formally,  $\delta \times 30 - 20 < \delta \times 20 - 10$ .

At the restaurant, the French syrah has attributes  $(30, -60)$ , while the Australian shiraz has attributes  $(20, -50)$ . The reference wine at the restaurant is then  $(\bar{a}_1, \bar{a}_2) = (25, -55)$ . Quality is now salient for both the French syrah (that is,  $30/25 > 60/55$ ) and the Australian shiraz (that is,  $25/20 > 55/50$ ). The salient thinker focuses on quality and chooses the more expensive French wine. Formally,  $30 - \delta \times 60 > 20 - \delta \times 50$ .

The role of comparative evaluation is clear: the extra \$10 cost of the French syrah looks high when perceived in the context of low store prices, but it feels low when perceived in the context of high restaurant prices. As a consequence, the consumer is willing to pay \$10 more to get higher quality at the restaurant but not at the store.

Comparative evaluation can also induce the so-called decoy effect, which has been well documented in psychology and marketing (Huber, Payne, and Puto 1982; Tversky and Simonson 1993): given a pairwise choice, adding an alternative dominated by one of the available options boosts the demand for the dominating option. This is at odds with standard theory, according to which the inclusion of irrelevant (in this case dominated) alternatives should not affect choice.

To see how this works, suppose that at the store a third, expensive wine  $d \equiv (30, -30)$  is added to the choice set. This wine has the same quality of the French syrah but a higher price. The inclusion of this option would not affect the preferences of a rational decision maker. Not so for a salient thinker. In the new choice set, the reference wine is  $(\bar{a}_1, \bar{a}_2) = [(30 + 30 + 20)/3], [(30 + 20 + 10)/3] = [80/3, -20]$ . Against this new reference good, the French syrah is now quality salient (that is,  $30/(80/3) > 20/20$ ), while the Australian shiraz continues to be price salient (that is,  $20/(80/3) < 20/10$ ). As a consequence, when the expensive decoy wine  $d$  is added, the salient thinker switches to choosing the expensive French wine. Formally,  $30 - \delta \times 20 > 20 - 10$ .

Once again, this instability of preferences is due to comparative eval-

uation. Without the decoy, the French wine is evaluated in comparison with the cheaper Australian wine. In this context, the consumer focuses on the fact that the French wine is more expensive, so it is perceived as a worse deal than the alternative. When the expensive decoy wine  $d$  is added to the choice set, the consumer compares the French wine with the decoy as well. In this context, the French wine is perceived to be a better deal, so the consumer focuses on its high quality and chooses it.

### 3. SALIENCE THEORY AND JUDICIAL DECISION MAKING

Judicial decision making is a promising field for applying salience theory. Most judicial decisions involve the resolution of complex trade-offs. Judicial evaluation of specific situations does not occur in a vacuum and may be shaped by the litigants' positions and the judge's own experience, over and above the informational content of these inputs. A recent experimental literature documents a variety of such contextual effects on legal decisions by jury-eligible persons as well as by judges (for example, Rachlinski 1996; Guthrie, Rachlinski, and Wistrich 2001; Viscusi 1999, 2001; Kelman, Rottenstreich, and Tversky 1996). In this section, we show that the salience model provides a unified account of these disparate pieces of experimental evidence. This suggests that the logic of comparative evaluation captured by salience theory may play an important role in judicial evaluation more generally.

A skeptic might object that experimental evidence sheds little light on actual courtroom decision making. Experiments are necessarily simple and fail to capture the complexity of actual cases. Judges in real-world cases care more about getting the right answer than they do when answering experimental questions. They have the time and resources to get the information they need. Perhaps most important, judges are trained to cut through the forest of information and to focus on the legally relevant facts to which they can apply the law.

We do not find these objections compelling. If anything, the complexity of actual courtroom experience would make judges more, rather than less, vulnerable to psychological biases than they are in streamlined experiments. In the courtroom, judges are bombarded with material that draws their attention away from legally relevant facts, including the human aspects of the case, attorneys' rhetoric, and the introduction of precedents pulling in different directions. Judges are extremely busy and must devote enormous effort to keep straight all the facts and legal nuance under consideration. Rather than cut through the forest of irrelevant dis-

agreements, judges may look for a clearing in the forest that lets the light shine through. Yet such a clearing is likely to be delivered precisely by the salient facts of the case, which stand out and draw judicial attention even when the salience of these facts is driven by legally irrelevant information. The salient facts or precedents enable judges to form quick intuitive assessments as to who is right and to proceed to process further evidence through this lens. In balancing conflicting evidence, salience of particular facts can thus distort the judicial decision-making process, more so when the situation is more complex. In our view, then, the evidence from the relatively clean and straightforward experiments puts a lower bound on the influence of psychological factors on judicial decisions.

### 3.1. Irrelevant Information and the Setting of Damages

Judicial setting of monetary damages often involves a subjective comparison of the loss incurred by the plaintiff and the cost imposed on the defendant. By the comparative-evaluation principle, these subjective quantifications can be influenced by bringing to a judge's mind specific instances of compensation. The following experiments provide two concrete examples of this phenomenon.

**3.1.1. Experiment 1.** Guthrie, Rachlinski, and Wistrich (2001) describe an experiment conducted with a subject pool of 167 federal magistrate judges, who were presented with the following case: "Suppose that you are presiding over a personal injury lawsuit that is in federal court based on diversity jurisdiction. The defendant is a major company in the package delivery business. The plaintiff was badly injured after being struck by one of the defendant's trucks when its brakes failed at a traffic light. Subsequent investigations revealed that the braking system on the truck was faulty, and that the truck had not been properly maintained by the defendant. The plaintiff was hospitalized for several months, and has been in a wheelchair ever since, unable to use his legs. He had been earning a good living as a free-lance electrician and had built up a steady base of loyal customers. The plaintiff has requested damages for lost wages, hospitalization and pain and suffering, but has not specified an amount. Both parties have waived their rights to a jury trial" (Guthrie, Rachlinski, and Wistrich 2001, p. 790). Judges were randomly assigned to either a No Anchor or an Anchor condition. Judges in the No Anchor group were asked, "How much would you award the plaintiff in compensatory damages?" Judges in the Anchor condition were also informed that "[t]he defendant has moved for dismissal of the case, arguing that it does not meet the jurisdictional minimum for a diversity case of \$75,000." These

judges had to rule on the motion, and then they were asked, "If you deny the motion, how much would you award the plaintiff in compensatory damages?" (p. 791). The additional information here constitutes a (normatively irrelevant) anchor on the grounds that the plaintiff had clearly incurred damages greater than \$75,000. As a consequence, absent anchoring effects, judges should deny the motion to dismiss, and there should be no difference in the damages awarded by judges belonging to the No Anchor and to the Anchor treatments.

Consistent with the motion being meritless, only two (2.3 percent) of the judges in the Anchor group granted the motion to dismiss the case. At the same time, the 66 judges in the No Anchor condition indicated that they would award plaintiff an average of \$1.25 million, while the 50 judges in the Anchor condition awarded an average of \$882,000. Asking the judges to rule on a frivolous motion depressed mean damage awards by more than \$350,000 (or 29.4 percent) in this hypothetical case, which points to a very strong anchoring effect.

**3.1.2. Experiment 2.** Viscusi (2001, p. 118) describes an experiment conducted with a subject pool of jury-eligible subjects, who were presented with the following case: "A major auto company with annual profits of \$7 billion made a line of cars with a defective electrical system. This failure led to a series of fires in these vehicles that caused 4 burn deaths per year. Changing the design to prevent these deaths would cost \$16 million for the 40,000 vehicles affected per year. This safety design change would raise the price of cars \$400 each. The company thought there might be some risk from the current design but did not believe it would be significant. The company notes that even with these injuries, the vehicle had one of the best safety records in its class. The courts have awarded each of the victims' families \$800,000 in damages to compensate them for the income loss and pain and suffering that resulted. After these lawsuits, the company altered future designs to eliminate the problem."

Subjects were randomly assigned to two groups, which we call Precautions Considered and Precautions Not Considered. In both groups, subjects were asked to indicate whether the court should award punitive damages and, if so, how much. However, in the Precautions Considered group, subjects were further told that the auto company had performed a corporate risk analysis and decided against taking precautions and changing the design. Note that precautions are inefficient from an economic perspective: the \$16 million cost to the company to fix the faulty system greatly exceeds the expected loss (expected number of fires times compensation per fire), which was valued at roughly \$3.2 million. Viscusi (2001)

highlights that, on these grounds, the additional information is irrelevant from the perspective of an efficient-precautions analysis.

In contrast to the efficient-precautions analysis, a large majority of subjects in either group would award punitive damages in this case. Central to our argument, however, is the fact that subjects in the Precautions Considered group were more likely to award punitive damages (96 percent versus 88 percent) and, conditional on this, awarded much higher damages: the median award more than tripled, from \$1 million in the Precautions Not Considered group to \$3.5 million in the Precautions Considered group.

The authors of the two studies interpret their results in light of distinct and specific mechanisms of decision making. To explain the effect of bringing the motion to dismiss to the judges' attention, Guthrie, Rachlinski, and Wistrich (2001) suggest that being exposed to the motion may have caused the judges to consider the possibility that the true damages in this case were exceptionally low, so their resolution of the uncertainty associated with the loss results in comparatively low damage estimates. To explain the effect of reminding judges about the failed possibility of taking precautions, Viscusi attributes the exceptionally high punitive damages to the subjects' outrage at the company's actions and to their wish to send a signal to the company that "human life is more important than profits" (Viscusi 2001, p. 118).<sup>6</sup>

While these case-specific mechanisms have merit, we argue that both examples are also fully consistent with the common mechanism of comparative evaluation. Before the formal analysis, we briefly describe its logic. After reading the damage case, the judge (or juror) comes up with an assessment of the plaintiff's loss. If this loss is salient in the context of the case, the judge sets high damages (potentially above the assessment) to reflect its perceived severity. If in contrast the loss is not salient, the judge sets lower damages (potentially below the assessment) to avoid an unfairly high penalty on the defendant. Consider the Guthrie, Rachlinski, and Wistrich (2001) experiment: when the motion to dismiss suggests that the plaintiff's severe injuries could be compensated with \$75,000 or less, any reasonable damage figure (which is necessarily much higher than \$75,000) is salient and more likely to stand out relative to the assessed loss. As a consequence, judges select lower damages in the Anchor group

6. To determine what drives his results, Viscusi varies the level of risk and the cost per life saved in his hypothetical cases. These variables are not significantly associated with the damages awarded, which leads to the conclusion that "[a]ll that matters is whether the company performed a risk analysis in advance" (Viscusi 2001, p. 123).

than in the No Anchor group. In the Viscusi (2001) experiment, when the jurors are reminded that no loss would have occurred had precautions been taken, a course of action the company contemplated and ultimately rejected, any estimated loss becomes more salient relative to the low cost to the company of avoiding it (regardless of efficiency considerations). As a consequence, jurors award higher damages in the Precautions Considered group than in the Precautions Not Considered group.<sup>7</sup>

Salience theory offers a formal account of the judge's decision-making process. In setting damages, he evaluates a trade-off between two dimensions: an assessment of the plaintiff's loss  $L$  (dimension 1) and the cost  $C$  to the defendant (dimension 2) of precautions or damage payments in court. A loss-cost package is then captured by the vector  $(-L, C)$ .

A judge wants to set compensation so as to make the plaintiff whole, namely, so that the plaintiff is indifferent between having his loss compensated and having suffered no loss at all. Formally, the judge calculates the plaintiff's willingness to accept bearing the loss  $L$ ,  $WTA(L)$ , which denotes the minimum amount of money  $C$  the plaintiff is willing to accept in order to choose  $(-L, C)$  over the status quo in which no injuries are sustained and, correspondingly, no damages are received from the defendant. A rational judge sets

$$WTA(L) = \min\{C \text{ subject to } u(C - L) \geq u(0)\},$$

where  $u(\cdot)$  is given by equation (3). Assume that the utility of the plaintiff is proportional to  $C - L$ , assigning equal weights ( $\theta_1 = \theta_2 = \frac{1}{2}$ ) to damages and loss, both expressed in dollars. Then the rational judge sets  $WTA(L) = L$ , irrespective of the provision of meritless motions or of information about precautions.

In contrast, the salient thinker includes other information—such as the possibility of dismissing the first case or the expectation that precautions are taken in the second case—in the case's context. This context **Ch** includes the plaintiff's hypothetical choice options that are required to evaluate his compensation, namely, the actual loss-cost package  $(-L, C)$  and the status quo  $(0, 0)$ , but it also includes any specific loss-cost package  $(-\tilde{L}, \tilde{C})$  that is brought to the judge's attention. In this formalism,

7. Although Viscusi's experiment pertains to punitive damages, we argue for interpreting the damage awards as compensation for the victims' loss. When jurors were given different estimates of the value of life, they adjusted the level of damages proportionately (which would not be warranted under a deterrence view of punitive damages), which supports this interpretation. Similarly, the assessed damages are broadly insensitive to the probability of injury or the cost of precautions.



the motion to dismiss corresponds to the loss-cost package  $\tilde{L} = L$ ,  $\tilde{C} = \$75,000$ , while the auto company precaution corresponds to the package  $\tilde{L} = 0$ ,  $\tilde{C} = \$16$  million. The willingness to accept computed by the salient-thinking judge in context **Ch** is then given by

$$\text{WTA}^S(L \mid \mathbf{Ch}) = \min \{C \text{ subject to } u^S(C - L \mid \mathbf{Ch}) \geq u^S(0, 0 \mid \mathbf{Ch})\},$$

where  $u^S(\cdot)$  is now given by equation (8). The judge still calculates the minimum damages  $C$  to be paid by the defendant such that the plaintiff chooses  $(-L, C)$  over  $(0, 0)$ , but the superscript  $S$  now indicates that the judge's trade-off between losses to the plaintiff and costs to the defendant is shaped by salience. In line with equation (8), when the loss is salient, the judge overweights it in the plaintiff's utility function and sets a higher WTA. When instead damages are salient, the judge overweights the benefit of receiving damages in the plaintiff's utility function and sets a lower WTA. Critically, whether the plaintiff's loss  $L$  or a given cost  $C$  is salient depends on which loss-cost package  $(-\tilde{L}, \tilde{C})$  the judge is reminded of.

Consider first the baseline No Anchor and Precautions Not Considered conditions, in which no information on the motion to dismiss or on precautions considered by the company is provided. In this case, the choice context is simply  $\mathbf{Ch} = \{(-L, C), (0, 0)\}$ . The reference loss in this context is  $L/2$ , and the reference damage cost is  $C/2$ . In this case, for any chosen level of damages  $C$ , losses and damages are equally salient because

$$\sigma\left(L, \frac{L}{2}\right) = \sigma\left(1, \frac{1}{2}\right) = \sigma\left(C, \frac{C}{2}\right),$$

which holds by homogeneity of degree 0. This implies the following:

**Lemma 1.** In the baseline experiments (No Anchor and Precautions Not Considered), salient-thinking judges set the rational damages  $C = L$ .

(All proofs are in the Appendix.) As implied by equation (8), when damages and losses are equally salient, judicial valuation is not distorted and satisfies the strict-liability principle.

Consider now the case in which the choice context is  $\mathbf{Ch} = \{(-L, C), (0, 0), (-\tilde{L}, \tilde{C})\}$ , where  $(-\tilde{L}, \tilde{C})$  is a generic loss-cost package the judge is reminded of. This could be one of the experimental treatments above (motion to dismiss or information about precautions), or more generally it could be a precedent-setting damage award in a related case. In this context, the reference loss is  $(L + \tilde{L})/3$ , while the reference damage is  $(C + \tilde{C})/3$ . Thus, the plaintiff's loss  $L$  is more salient than a chosen level  $C$  of damages imposed on the defendant if and only if

$$\sigma\left(L, \frac{L + \tilde{L}}{3}\right) > \sigma\left(C, \frac{C + \tilde{C}}{3}\right).$$

In the remainder of the analysis, we focus on the case in which  $\tilde{L} < 2L$  and  $\tilde{C} < 2C$  (which both hold in the examples in question). In this case, it is immediate to show that the plaintiff's loss is salient if and only if

$$\frac{C}{L} < \frac{\tilde{C}}{\tilde{L}}, \quad (10)$$

namely, whenever the ratio of the company's cost in terms of damages  $C$  relative to the plaintiff's assessed loss  $L$  is lower than the corresponding ratio in the anchor scenario  $(-\tilde{L}, \tilde{C})$ . Instead, the company's cost is salient when damages  $C$  are high (relative to the loss) compared with those in the anchor scenario  $(-\tilde{L}, \tilde{C})$ .

This mechanism has far-reaching implications. When reminded of a stingy compensation package (small  $\tilde{C} / \tilde{L}$ ) per unit of loss, the judge views even very small damages as salient, which reduces the judge's assessed WTA. When reminded of the possibility of avoiding the plaintiff's losses altogether (large  $\tilde{C} / \tilde{L}$ ), the loss incurred by the plaintiff is salient, which boosts the judge's WTA. More generally, judges set damages as follows:

**Proposition 1.** When the anchor  $(-\tilde{L}, \tilde{C})$  is provided, the salient thinker sets damages

$$\text{WTA}^s = \begin{cases} \delta \times L & \text{if } \tilde{C} / \tilde{L} < \delta, \\ \tilde{C} / \tilde{L} & \text{if } \delta < \tilde{C} / \tilde{L} < 1 / \delta, \\ 1 / \delta \times L & \text{if } \tilde{C} / \tilde{L} > 1 / \delta. \end{cases} \quad (11)$$

In rough terms, we find that the salient-thinking judge targets the share of the compensated loss  $C/L$  to the ratio  $\tilde{C}/\tilde{L}$  prevailing in the comparative situation. In this sense,  $\tilde{C}/\tilde{L}$  truly provides an anchor for setting compensation. When  $C/L$  is above the anchor  $\tilde{C}/\tilde{L}$ , the cost imposed on the defendant is the salient attribute of the case, which tends to induce the judge to reduce  $C$ . When  $C/L$  is below the anchor  $\tilde{C}/\tilde{L}$ , the plaintiff's loss is the salient attribute of the case, which tends to induce the judge to increase  $C$ . This mechanism implies that if in the comparative situation the company bears a small cost  $\tilde{C}/\tilde{L} < 1$ , the presence of the anchor reduces damages below the initial assessment of the loss  $L$ . When instead in the comparative situation the plaintiff bears a small loss  $\tilde{C}/\tilde{L} > 1$ , the anchor boosts damages above the initial assessment of the actual loss  $L$ . Because the costs imposed on the company tend to be set in the same pro-

portion to the loss as that in the anchor, proposition 1 might be called a model of comparative proportionality of damages.

At this point we revisit the two experiments. The motion to dismiss in Guthrie, Rachlinski, and Wistrich (2001) provides an anchor where  $\tilde{L} = L$  and  $\tilde{C} = \$75,000$ . The ratio  $\tilde{C}/\tilde{L}$  is equal to  $\tilde{C}/L$ , which makes any compensation  $C$  above  $\tilde{C} = \$75,000$  salient. According to equation (11), this depresses the awarded level of damages, consistent with the experimental findings. The consideration of precautions in Viscusi's (2001) experiment provides an anchor where  $\tilde{L} = 0$  and  $\tilde{C} = \$16$  million. Here the ratio  $\tilde{C}/\tilde{L}$  is extremely high, making losses salient for any positive damage  $C$ . This implies, by equation (11), that the awarded damages are increased, which is also consistent with the experimental findings.<sup>8</sup>

The intuition for these results is clear. When adjusting damages around an assessment of losses, the judge faces the difficult task of trading off the nonmonetary loss incurred by the plaintiff and the monetary cost imposed on the defendant. The principle of comparative evaluation implies that the presence of an anchor for costs affects how this trade-off is resolved. Making judges think about precedents in which sizeable losses receive no or little compensation induces them to view even fairly low damages as generous, which reduces their own estimate of a fair compensation. Making judges think about precedents in which compensation was generous, or about counterfactuals that make the losses more salient, induces them to view fairly high damages as stingy, which thus increases their compensation recommendations.<sup>9</sup>

8. Of course, it is not always possible for judges to exactly match  $\tilde{C}/\tilde{L}$ . In particular, when the anchor provides very little compensation,  $(\tilde{C}/\tilde{L}) < \delta$ —the case of the experiment in Guthrie, Rachlinski, and Wistrich (2001)—damages are salient but the judge still needs to compensate the nonsalient loss  $\delta \times L$ . The fact that the plaintiff's loss is nonsalient, however, implies that damages are set below the assessment  $L$ . Matching the anchor is also not possible when it assigns a very high cost to the defendant per unit loss of the plaintiff—the case of Viscusi's (2001) experiment. In this case, matching the ratio  $\tilde{C}/\tilde{L}$  when losses do occur would require the judge to impose arbitrarily high damages on the defendant. Instead, the judge limits the damages to be commensurate with the salient loss of  $(1/\delta) \times L$ . The fact that the plaintiff's loss is now salient then implies that compensation is above the initial assessment  $L$ .

9. In the context of riskless consumer choice, this finding parallels the famous beer experiment proposed by Thaler (1985, 1999). Subjects are told to imagine sunbathing with a friend on a beach in Mexico. It is hot, and the friend offers to get an ice-cold Corona from the nearest seller, 100 yards away, to be brought back and consumed on the beach. Subjects are asked for their reservation price. In the first treatment, the nearest place to buy the beer is a beach resort. In the second treatment, the nearest place is a corner store. Many subjects would pay more for a beer from a resort than for one from the store, which contradicts the fundamental assumption that willingness to pay for a good is independent of context. As we show in Bordalo, Gennaioli, and Shleifer (2013), the salience

This discussion illustrates how the anchoring mechanism may be pervasive in legal decision making. Anchors can most naturally be formed by precedents, in which case salience provides a force of conformity to precedent preserving the stability of the law. But anchors can also arise from irrelevant information, as illustrated in Guthrie, Rachlinski, and Wistrich's (2001) experiment, or from judges' expectations about, or counterfactuals to, the facts of the case, as illustrated in Viscusi's (2001) experiment.

### 3.2. Legal Decoys

The logic of Section 3.1 has further implications for areas of law in which parties must choose between several courses of action. This is illustrated by the following hypothetical legal counseling case proposed by Kelman, Rottenstreich, and Tversky (1996) to undergraduate students at Stanford University:

The Economics Department of a major university voted, two years ago, to recommend that your client, then an Associate Professor at the University, not be promoted to a tenured position. She claims that she was discriminated against on account of her gender. . . . Your client is interested in (1) being compensated for wrongs done to her and in (2) having the University publicly admit guilt in her case. At the same time, your client is very interested in the progress of women generally and wants (3) to do her part to push for affirmative action plans that would help women in Economics. . . . The University counsel's office has contacted you and asked you to communicate settlement offers to your client. (p. 298)

Subjects had to advise their client on which settlement offer to accept. One group of subjects had to choose between two settlement offers (choice context 1). The first offer bound the university to an affirmative action plan for the economics department without admitting guilt or paying damages. The second offer consisted of a public admission of guilt and \$45,000 in damages. Another group of subjects (choice context 2) had to choose among the two offers plus a third offer consisting of a public admission of guilt plus a donation of \$35,000 in the client's name to her favorite charity. Note that the third offer is clearly inferior to the second offer, because the plaintiff could always accept the \$45,000 dam-

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model explains the Thaler (1985, 1999) experiment through a mechanism similar to the one illustrated here. Because the salient thinker expects a high price for beer at the resort, he is willing to pay a higher price and still perceive the beer to be a good deal (salient quality). In contrast, at the store, where beer is expected to be cheap, a high price would be very salient, and the salient thinker is unwilling to pay it.

ages of the second offer, give \$35,000 to charity, and keep \$10,000 for herself.

The behavior of rational subjects should be the same in both choice contexts. This is because the third settlement offer is dominated by the second (and is thus irrelevant). In the experiment, however, behavior changed markedly from choice context 1 to choice context 2: while only 50 percent of subjects chose the second settlement offer in choice context 1, 76 percent of the subjects chose the second settlement offer in choice context 2, when the third offer was included. In line with the decoy effect, the introduction of a dominated settlement offer increased the valuation of the dominating offer.

The decoy logic in Section 2.4 illustrates how salience accounts for this effect: the presence of the dominated third offer, with its lower monetary compensation, increases the salience of the dominating option's higher monetary compensation and thus boosts the latter's valuation. Formally, suppose that the plaintiff values two broad categories of compensatory measures: nonmonetary and monetary. Nonmonetary measures include the university's public admission of guilt and/or its pursuit of an affirmative action plan. Denote by  $g$  the defendant's dollar value of a public admission of guilt and by  $G$  the value of an affirmative action plan. Monetary measures obviously consist of damages, part of which may be valued less than free cash if earmarked for a specific use (charity in this case). Suppose that the defendant discounts each dollar earmarked for charity by  $\varphi \leq 1$ .<sup>10</sup> The three settlement offers are then described by

$$S_1 = (G, 0), \quad S_2 = (g, D_2), \quad S_3 = (g, \varphi \times D_3),$$

where attribute 1 captures nonmonetary benefits, attribute 2 captures monetary benefits,  $D_2 = \$45,000$ , and  $D_3 = \$35,000$ .

If the plaintiff's utility function has  $\theta_1 = \theta_2 = \frac{1}{2}$  in equation (3), she computes the overall utility of an offer by simply adding monetary and nonmonetary attributes. In contrast, the salient thinker attaches a higher weight to the offer's salient dimension, be it its monetary or nonmonetary component. For simplicity, assume that the plaintiff values the university-wide affirmative action more than the admission of guilt,  $G > g$ , and that the plaintiff is not willing to pay \$45,000 out of her pocket for an admission of guilt by the university,  $g < D_2$ . These assumptions are reasonable and have two implications. First,  $S_1$  is the best offer from the viewpoint of nonmonetary compensation and the worst offer from the viewpoint of

10. When  $\varphi = 1$ , the plaintiff would individually implement the same, or higher, charity donation of the settlement offer.

monetary compensation. Second, the valuation of  $S_2$  is higher if the damages it entails, rather than nonmonetary compensation, are salient.

Consider the behavior of the salient thinkers. In choice context 1, which compares offers  $S_1$  and  $S_2$ , the reference nonmonetary compensation is  $(G + g)/2$ , while the reference level of damages is  $D_2/2$ . The salient attribute for offer  $S_1$  is its total lack of damages, because  $\sigma(0, D_2/2) > \sigma[G, (G + g)/2]$  by homogeneity of degree 0. The salient attribute for offer  $S_2$  is its higher damages when

$$\sigma(D_2, D_2/2) = \sigma(2, 1) > \sigma(g, (G + g)/2) = \sigma((G + g)/2g, 1), \quad (12)$$

which is satisfied if and only if  $G < 3g$ . If  $S_2$ 's damages are salient, its evaluation increases (because high damages are the offer's best attribute,  $D_2 > g$ ), so  $S_2$  is more likely to be chosen over  $S_1$ .<sup>11</sup>

Consider now the problem faced by subjects in choice context 2, when the decoy offer  $S_3 = (g, \varphi \times D_3)$  is added to the choice set. Now, when choosing between  $S_1$  and  $S_2$ , the salient thinker evaluates these offers in light of the reference attribute values  $[(G + 2g)/3, (D_2 + \varphi D_3)/3]$ . The salient attribute for offer  $S_1$  continues to be its total lack of damages (because of homogeneity of degree 0), so its valuation is the same in both contexts. Intuitively, the fact that  $S_1$  is the only option paying no damages remains the distinguishing feature of this offer. On the other hand, the salient attribute of  $S_2$  is its monetary compensation if and only if  $\sigma[D_2, (D_2 + \varphi D_3)/3] > [g, (G + 2g)/3]$ , which is satisfied if and only if  $G < g \times [(7D_2 - 2\varphi D_3)/(D_2 + \varphi D_3)]$ . Comparing this condition to equation (12) leads to the following result.

**Proposition 2.** The set of conditions under which offer  $S_2$  is chosen is strictly weaker in choice context 2 than in choice context 1 if and only if  $D_2/D_3 > 5/4 \times \varphi$ .

The introduction of the dominated offer  $S_3$  increases the appeal of the dominating offer  $S_2$  provided that the damages paid by  $S_2$  are sufficiently high relative to those paid by  $S_3$ . The intuition is straightforward: when  $S_3$  fares much worse than  $S_2$  in term of damages, the relatively high damages of  $S_2$  become salient, which thereby boosts its valuation. It is easy to see that the condition in proposition 2 is met by the experiment's monetary values  $D_2 = \$45,000$  and  $D_3 = \$35,000$ .

11. Formally, if  $G < 3g$ , monetary compensation is salient for both  $S_1$  and  $S_2$ , so  $S_2$  is chosen if and only if  $\delta \times g + D_2 > \delta \times G$ . If instead  $G > 3g$ , monetary compensation is salient for  $S_1$  and nonmonetary compensation is salient for  $S_2$ , so  $S_2$  is chosen if and only if  $g + \delta D_2 > \delta \times G$ , which is a stronger condition.

As with the anchoring effect in Section 1, the principle underlying the model's account of decoy effects in settlement offers is that of comparative evaluation. When solving a complex problem such as choosing among multidimensional offers, individuals do not harness their own absolute metric for monetary and nonmonetary compensation and apply it to the offers at hand. Rather, they evaluate different policies in context by comparing their different features and by focusing on each offer's most distinguishing aspect. When an inferior offer is added, the advantage of the dominating offer becomes salient, which increases its valuation.

### 3.3. Framing of Risky Prospects

We conclude our analysis by considering the role of salience in shaping risk attitudes in the legal context. It is well known that individuals' risk preferences depend on whether payoffs are framed in terms of gains or losses, even though such frames are normatively irrelevant (Kahneman and Tversky 1979). Rachlinski (1996) investigates this issue in a domain in which risk preferences are central to judicial process, namely, the decision of whether to settle or litigate. A simple litigation problem was presented to law students, half of whom played the role of counsel to the plaintiff and half the role of counsel to the defendant. Subjects had to advise their client on whether to settle or litigate. In particular, "[p]laintiff-subjects had to choose between a certain \$200,000 settlement offer and a 50% chance of winning \$400,000 at trial (and a corresponding 50% chance of winning nothing). Defendant-subjects had to choose between paying a \$200,000 settlement offer and facing a 50% chance of losing \$400,000 at trial with a corresponding 50% chance of losing nothing" (Guthrie, Rachlinski, and Wistrich 2001, p. 795). Rachlinski found that 77 percent of plaintiff-subjects advised settling but that only 31 percent of defendant-subjects advised settling. Plaintiff-subjects were risk averse; defendant-subjects, were risk seeking.

This behavior is inconsistent with expected-utility theory. Both plaintiff- and defendant-subjects choose between a safe amount and a mean-preserving spread around it. Under common risk preferences, plaintiffs and defendants should both prefer to settle (if risk averse) or to litigate (if risk seeking). The conventional explanation for the observed instability of risk preferences relies on prospect theory's S-shaped value function, which is assumed to be concave for gains and convex for losses. This induces risk aversion for plaintiffs (who choose between a sure gain and a risky gain) and risk seeking for defendants (who choose between a sure loss and a risky loss).

Salience theory can explain this instability of risk attitudes as a consequence of context dependence: changing the framing from gains to losses changes the lottery outcome perceived to be salient, which thereby changes risk preferences.<sup>12</sup> Salience thus allows us to provide a novel unified psychological explanation for framing, anchoring, and decoy effects.

To see how the salience model can generate framing effects, consider the choice faced by plaintiff-subjects in Rachlinski's experiment. The risky litigation has two possible outcomes: the plaintiff loses the litigation in state 1 and wins in state 2, and each state occurs with probability  $\theta_1 = \theta_2 = .5$ . In terms of its payoffs in the two states of the world, the litigation option is given by  $R = (0, 400)$  (to streamline notation, we write the payoffs in units of thousands of dollars). In turn, the settlement option gives the same payoff in both states,  $S = (200, 200)$ . When comparing the two options, the reference payoff in state 1 is  $\bar{a}_1 = (0 + 200)/2 = 100$ , and that in state 2 is  $\bar{a}_2 = (400 + 200)/2 = 300$ . The salient outcome for litigation is then loss state 1 because  $\sigma(0, 100) > \sigma(400, 300)$ , because of the diminishing sensitivity property of salience in equation (5). Intuitively, when a sure \$200 is in hand, the risk of ending up with nothing is more salient than the possibility of gaining \$400. Because the downside is salient, litigation is valued less than its expected value of \$200 (as in experiment 1 in Section 3). As a consequence, plaintiff-subjects prefer settlement to litigation, exhibiting risk averse behavior.

Consider now the choice faced by defendant-subjects. In this frame, the available options are a sure loss coming from a settlement  $S = (-200, -200)$  and a risky litigation  $R = (0, -400)$ , where—consistent with the convention above—in state 1 the defendant wins and the plaintiff loses. As before,  $\theta_1 = \theta_2 = .5$ . From the defendant-subjects' perspective, the reference payoffs are  $\bar{a}_1 = (0 - 200)/2 = -100$  and  $\bar{a}_2 = (-400 - 200)/2 = -300$ . The salient outcome of litigation is now the winning state 1 because  $\sigma(0, -100) > \sigma(-400, -200)$ , because of diminishing sensitivity and reflection (equation [6]). When compared with a sure loss of \$200, the possibility of nullifying that loss is more salient than the risk of losing \$400. Because the litigation's upside is salient, litigation is valued above its expected value of  $-\$200$ . As a consequence, defendant-subjects prefer litigation to settlement, exhibiting risk-seeking behavior.

12. In other settings, both plaintiffs and defendants stand to gain from the litigation process, as, for example, in copyright-sharing decisions. When all payoffs are positive, a salient thinker may still shift from risk-seeking to risk-averse behavior depending on the framing of the gains, as in the example in Section 3. As we explained there, this behavior is incompatible with prospect theory.



Changing how payoffs are framed, from the gain to the loss domain, alters risk preferences by changing the nature of the salient outcome. In the gain domain, the downside risk of losing nothing is salient, while in the loss domain the upside risk of getting nothing is salient. Given that the problem faced by defendants simply subtracts \$400,000 from the problem faced by plaintiffs, the framing effect shown here has the same nature of the context-dependent shift in risk attitudes discussed in Section 3.

Even though this experiment involves legal counseling of plaintiffs or defendants, the same effects are likely to apply to the judiciary, given that judges often play an active role in supervising settlement talks. Guthrie, Rachlinski, and Wistrich (2001) design an experiment with 167 federal magistrate judges, which also documents a shift in pro-litigation attitudes as the problem is reframed from gains to losses. But the issue is broader, as many judicial decisions involve choice among risky prospects. For example, Guthrie, Rachlinski, and Wistrich (2001) document that judges are more likely to vote for a risky reorganization plan when creditors' payoffs are framed as losses rather than as gains.

#### 4. CONCLUSION

Judicial decisions of necessity must balance various aspects of a case ranging from the severity of misconduct and damages to the nature of the penalties. The process of reaching such balance or proportionality is vulnerable to the influence of salience, the idea that certain aspects of the case stand out in judges' attention and as a consequence influence judicial decisions. Of course, there are many legal mechanisms that try to limit salience or other psychological influences, most importantly precedents. The subtle point here, however, is that via the mechanism of comparative evaluation, these very mechanisms can shape judicial decision making over and above their original intent. Indeed, the experimental evidence suggests (but does not prove) that salience can induce even experienced judges to extrapolate too much from past cases or counterfactual scenarios, which distorts standard legal reasoning.

We have illustrated our approach using the analysis of experimental evidence, but here we consider some broader implications of our framework. In many situations, past cases anchor judicial decisions. This may explain why lawyers spend so much time relating the facts of the case to their favored precedents. But salience may also render judicial decisions inconsistent across cases, especially when driven by salient but legally

irrelevant facts. Plaintiffs or defendants might be conspicuously unappealing individuals, which prompts the court to find ways to rule against them. The plaintiff might have suffered extreme harm with no evidence of negligence, which encourages courts to nonetheless find responsibility so that harm is not so salient relative to compensation. Such hard cases draw judicial attention to the features that should perhaps matter little but end up mattering more.

A side benefit of salient thinking is that it encourages legal evolution, which usually takes the form of distinguishing cases from precedents (see, for example, Gennaioli and Shleifer 2007). Cases that differ from precedents along a salient dimension are likely to be those in which precedent leads to decisions whose unfairness or disproportionality if current law is applied stands out. The evolution of exceptions to the economic loss rule, described by Niblett, Posner, and Shleifer (2010), has some of that character. Of course, salience can also encourage distinguishing on the basis of legally irrelevant features of the case and not just on efficient legal evolution. To the extent that they shape the salience of the facts, cases that come to the judge's mind take on great significance (Radin 1925).

It should not be surprising that legal procedure has evolved to constrain the influence of salience and other cognitive biases. The rules of evidence control what is presented to judges and juries, and an elaborate body of law has developed to exclude information that might be prejudicial. The legal system seems highly conscious of the influence of salience; we doubt, however, that this influence is wholly eliminated.

## APPENDIX: PROOFS

### Proof of Lemma 1

In the No Anchor condition, the choice set is  $\mathbf{Ch} = (-L, C), (0, 0)$ . In this context, the reference loss is  $L/2$  and the reference damage cost is  $C/2$ . Homogeneity of degree 0 of the salience function then implies  $\sigma(L, L/2) = \sigma(1, \frac{1}{2}) = \sigma(C, C/2)$ , so for any chosen level of damages  $C$ , losses and damages are equally salient. As a consequence,  $u^s(C - L | \mathbf{Ch}) = (C - L)/2$ , while  $u^s[(0, 0) | \mathbf{Ch}] = 0$ . Then  $\text{WTA}^s$  equals  $\inf\{C \text{ subject to } C - L \geq 0\} = L$ . Therefore, the salient-thinking judge sets the rational level of damages  $C = L$ .

### Proof of Proposition 1

The reference loss level in  $\mathbf{Ch} = \{(0, 0), (-L, C), (-\tilde{L}, \tilde{C})\}$  is  $\bar{L} = (L + \tilde{L})/3$ , while the reference level of damages is  $\bar{C} = (C + \tilde{C})/3$ . Thus, the salience of losses and damages of option  $(-L, C)$  are, respectively,

$$\sigma\left(1, \frac{1 + \tilde{L}/L}{3}\right) \quad \text{and} \quad \sigma\left(1, \frac{1 + \tilde{C}/C}{3}\right).$$

Recall from the text the assumption  $\tilde{L} < 2L$  and  $\tilde{C} < 2C$  (which holds in the examples). It follows that losses are salient when

$$\frac{\tilde{C}}{\tilde{L}} > \frac{C}{L}. \quad (\text{A1})$$

Note that as  $C$  varies in the range  $(\tilde{C} \times \frac{1}{2}, \tilde{C} \times L/\tilde{L})$ , it can take values larger or smaller than the reference damage  $\tilde{C}$ .

Recall the definition of willingness to pay:

$$\text{WTA}^S = \min\{C \text{ subject to } u^S(C - L \mid \text{Ch}) \geq u^S(0, 0 \mid \text{Ch})\},$$

Consider first the case in which the awarded damages are salient, so they fully compensate for losses when  $C = \delta L$ . This compensation is indeed salient when  $\tilde{C}/\tilde{L} > C/L$ . Thus,  $\text{WTP} = \delta L$  whenever  $\tilde{C}/\tilde{L} < \delta$ .

Consider now the case in which  $\tilde{C}/\tilde{L} > \delta$ . If the damages are set at  $C < L \times \tilde{C}/\tilde{L}$ , then the loss would be salient, so the damages can be increased until  $L/\delta$  as long as the salience ranking does not change:  $\text{WTA} = \min\{L \times 1/\delta, L \times \tilde{C}/\tilde{L}\}$ . Therefore,  $\text{WTP} = L \times \tilde{C}/\tilde{L}$  for  $\tilde{C}/\tilde{L} < 1/\delta$  and  $\text{WTP} = L/\delta$  for  $\tilde{C}/\tilde{L} > 1/\delta$  (and  $\tilde{C} < 2C$ ; namely,  $\tilde{C} < 2\delta L$ ).

## Proof of Proposition 2

Because the valuation of offer  $S_1$  is constant in both contexts, the inclusion of the decoy offer  $(g, \varphi \times D_3)$  relaxes the conditions under which  $S_2$  is chosen if and only if it relaxes the condition that  $S_2$ 's upside—its monetary compensation, or damages—is salient. In context 1,  $S_2$ 's damages are salient if and only if  $G < 3g$ . In context 2 (with the decoy),  $S_2$ 's damages are salient if and only if  $G < g \times (7D_2 - 2\varphi D_3)/(D_2 + \varphi D_3)$ . Thus, the decoy makes it more likely for  $S_2$  to be chosen if and only if  $g \times (7D_2 - 2\varphi D_3)/(D_2 + \varphi D_3) > 3g$ ; namely,  $D_2/D_3 > 5/4 \times \varphi$ .

## REFERENCES

- Bordalo, Pedro, Nicola Gennaioli, and Andrei Shleifer. 2012. Salience Theory of Choice under Risk. *Quarterly Journal of Economics* 127:1243–85.
- . 2013. Salience and Consumer Choice. *Journal of Political Economy* 121: 803–43.
- Epstein, Lee, William M. Landes, and Richard A. Posner. 2013. *The Behavior of Federal Judges: A Theoretical and Empirical Study of Rational Choice*. Cambridge, MA: Harvard University Press.
- Frank, Jerome. 1930. *Law and the Modern Mind*. New York: Brentano's Publishers.
- . 1949. *Courts on Trial: Myth and Reality in American Justice*. Princeton,

- NJ: Princeton University Press.
- Gennaioli, Nicola, and Andrei Shleifer. 2007. The Evolution of Common Law. *Journal of Political Economy* 115:43–68.
- . 2008. Judicial Fact Discretion. *Journal of Legal Studies* 37:1–35.
- Guthrie, Chris, Jeffrey Rachlinski, and Andrew Wistrich. 2001. Inside the Judicial Mind. *Cornell Law Review* 86:777–830.
- Huber, Joel, John Payne, and Christopher Puto. 1982. Adding Asymmetrically Dominated Alternatives: Violations of the Regularity and Similarity Hypothesis. *Journal of Consumer Research* 9:90–98.
- Kahneman, Daniel, and Amos Tversky. 1979. Prospect Theory: an Analysis of Decision under Risk. *Econometrica* 47:263–92.
- Kelman, Mark, Yuval Rottenstreich, and Amos Tversky. 1996. Context-Dependence in Legal Decision Making. *Journal of Legal Studies* 25:287–318.
- Niblett, Anthony, Richard A. Posner, and Andrei Shleifer. 2010. The Evolution of a Legal Rule. *Journal of Legal Studies* 39:325–58.
- Posner, Richard A. 2008. *How Judges Think*. Cambridge, MA: Harvard University Press.
- Rachlinski, Jeffrey. 1996. Gains, Losses, and the Psychology of Litigation. *Southern California Law Review* 70:113–86.
- Rachlinski, Jeffrey, Andrew Wistrich, and Chris Guthrie. 2013. Altering Attention in Adjudication. *UCLA Law Review* 60:1586–1618.
- Radin, Max. 1925. Theory of Judicial Decision: Or How Judges Think. *American Bar Association Journal* 11:357–62.
- Thaler, Richard. 1985. Mental Accounting and Consumer Choice. *Marketing Science* 4:199–214.
- . 1999. Mental Accounting Matters. *Journal of Behavioral Decision Making* 12:183–206.
- Tversky, Amos, and Daniel Kahneman. 1974. Judgment under Uncertainty: Heuristics and Biases. *Science*, September, pp. 1124–31.
- Tversky, Amos, and Itamar Simonson. 1993. Context Dependent Choices. *Marketing Science* 39:1179–89.
- Viscusi, W. Kip. 1999. How Do Judges Think about Risk? *American Law and Economics Review* 1:26–62.
- . 2001. Jurors, Judges, and the Mistreatment of Risk by the Courts. *Journal of Legal Studies* 30:107–42.